AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1.   (Currently amended) A method of producing volume renderings from magnetic resonance image data in real time with user interactivity, the method comprising:

        collecting magnetic resonance image (MRI) from a magnetic resonance coil, the MRI data representative of shapes within an image volume;

        transferring the MRI data to a computer; and

        producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume by rendering a plurality of image slices;

        wherein collecting MRI data, and transferring MRI data is performed continuously; and

        displaying the three-dimensional volume rendering on a monitor at a rate of about 10 or more frames per second with low a latency between the act of collecting MRI data and the act of displaying the three-dimensional volume rendering that is equal to or less than about one third of a second.

2.   (Canceled)

3.   (Currently amended) The method of claim 1 2 wherein the act of producing a three-dimensional rendering from the MRI data includes rending a plurality of two-dimensional image slices.

4.   (Previously presented) The method of claim 3 wherein a two-dimensional pulse sequence is executed using view sharing between even and odd echoes.

5.   (Currently amended) The method of claim 1 2 wherein the act of producing a

three-dimensional rendering from the MRI data includes rendering a three-dimensional rectilinear slab.

6.   (Previously presented) The method of claim 5 wherein a three-dimensional pulse sequence is executed using view sharing between even and odd echoes.

7.   (Currently amended) The method of claim 1 2 wherein the act of producing a three-dimensional rendering includes:

        reconstructing image data from the MRI data, the reconstructed image data being organized into sets of image slices; and

        displaying the reconstructed image data on a monitor to form a three-dimensional rendering.

8.   (Original) The method of claim 7 wherein each image slice is formed from a set of reconstructed image data and the act of displaying the reconstructed image slices includes displaying each reconstructed image slice after all of the set of reconstructed image data is complete.

9.   (Original) The method of claim 7 wherein each image slice is formed from a set of reconstructed image data and the act of displaying the reconstructed image slices includes displaying at least a portion each reconstructed image slice before the entire set of reconstructed image data is complete.

10.   (Currently amended) The method of claim 1 2 wherein the act of producing a three-dimensional rendering includes:

        reconstructing image data from the MRI data, the reconstructed image data being organized into a rectilinear slab; and

        generating a volume rendering from the rectilinear slab of reconstructed image data; and

displaying the three-dimensional rendering on a monitor.

11.   (Previously presented) The method of claim 10 wherein the acts of generating and displaying the three-dimensional rendering are completed after the act of reconstructing image data is complete for the entire rectilinear slab.

12.   (Previously presented) The method of claim 10 wherein the acts of generating and displaying the three-dimensional rendering are completed after the act of reconstructing image data is complete for at least a portion of the rectilinear slab.

13.   (Canceled)

14.   (Canceled)

15.   (Currently amended) The method of claim 1 13 wherein the act of displaying the three-dimensional volume rendering on a monitor includes the act of displaying the three-dimensional volume rendering on the monitor using alpha blending.

16.   (Currently amended) The method of claim 1 13 wherein the act of displaying the three-dimensional volume rendering on a monitor includes the act of displaying the three-dimensional volume rendering on the monitor using maximum intensity projections.

17.   (Currently amended) The method of claim 1 2 wherein:
        the method further comprises determining the position of a cut plane through the three-dimensional volume rendering; and
        the act of producing a volume rendering includes displaying the image data on only one side of the cut plane.

18.   (Currently amended) The method of claim 1 2 wherein:

the act of producing a three-dimensional rendering from the MRI data includes displaying the three-dimensional volume rendering on a monitor, the displayed three-dimensional rendering having a view; and

the act of collecting (MRI) data from a magnetic resonance coil representative of shapes within an image volume includes scanning an image volume so that the MRI data is organized into image planes orthogonal to the view of the three-dimensional rendering displayed on the monitor.

19.   (Previously presented) An apparatus for producing three-dimensional volume renderings from magnetic resonance image data in real time, the apparatus comprising:

a magnetic resonance image (MRI) scanner having a magnetic resonance coil configured to generate MRI data representative of shapes within an image volume;

a pulse sequence generator in communication with the magnetic resonance coil and configured to execute a pulse sequence using view sharing between even and odd echoes; and

a computer in data communication with the MRI scanner, the computer configured to receive the MRI data from the MRI scanner and to produce a three-dimensional rendering of a volume from a plurality of image slices from the MRI data in real time with respect to the act of collecting the MRI data from the magnetic resonance coil.

20.   (New) A method of producing volume renderings from magnetic resonance image data in real time with user interactivity, the method comprising:

collecting magnetic resonance image (MRI) data from a magnetic resonance coil, the MRI data representative of shapes within an image volume;

transferring the MRI data to a computer;

producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume by rendering a plurality of image slices; and

displaying the three-dimensional volume rendering on a monitor at a rate of about 10 or more frames per second with a latency between the act of collecting MRI data and the act of displaying the three-dimensional volume rendering that is equal to or less than about one third of a second;

wherein collecting MRI data, transferring MRI data, producing a three-dimensional rendering of a volume and displaying the three-dimensional volume rendering on the monitor is performed continuously, and

wherein the three-dimensional volume rendering displayed on the monitor is updated after partial changes to the MRI data,

wherein when the user interactively requests changes in viewing angle and/or position of the volume rendering, the three-dimensional volume rendering displayed on the monitor is updated asynchronous to the acquisition of image data.